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EFFECT OF LEAD ABSORPTION ON BLOOD CALCIUM[1]

By WENDELL V. JENRETTE, *Assistant Physiologist*, and LAWRENCE T. FAIRHALL, *Principal Industrial Toxicologist, United States Public Health Service*

In view of the relationship that repeatedly has been shown to exist between calcium metabolism and lead, the question has occasionally arisen as to whether absorbed lead affects the blood calcium level. That the blood calcium content may be modified experimentally by various means is well known, and in view of the fact that lead is absorbed and transported in the blood stream in minute amount, is deposited in bone tissue and is susceptible to removal from the bones under certain conditions, any possible interrelationship of lead and calcium is of interest. The formation of a lead calcium phosphate and precipitation of blood calcium by lead which has been investigated by Bischoff and Maxwell (*1*) would seem of possible significance in this connection.

Changes in blood calcium have been shown to occur in a variety of cases. Castelli (*2*) found that the introduction of bacteria or their metabolic products into the circulation of a normal dog produced a lowering of total blood calcium. The lowering was not as marked as in parathyroidectomy but was constant and pronounced. Following the administration of parathyroid extract to six patients suffering from lead poisoning Hunter and Aub (*3*) found that blood calcium was usually increased.

Hughes, Titus, and Smith (*4*) found an increase in blood calcium accompanying egg production. The calcium content of the plasma of chicks from 1 day to 4 months of age was very nearly constant, averaging about 13 mg. per 100 cc. In immature pullets, capons, mature cockerels, and moulting hens not in production it averaged 20 mg. With mature pullets in production it averaged 27 mg. and in hens after moulting and in production it amounted to 31 mg.

Cheymol and Quinquaud (*5*) noted an increase in the calcium content of the arterial and venous blood following asphyxiation of a dog by mechanical obstruction of the trachea. Cheymol and Quinquaud also investigated the variation in blood calcium of dogs at intervals

[1] From the Division of Industrial Hygiene, National Institute of Health.

over 24 hours (*6*). With dogs confined to cages without exercise for 5 to 12 weeks the maximum variation in blood calcium was 1.1 mg./100 cc. When dogs were starved 25 to 50 days the blood calcium decreased 15 to 25 percent in the same period.

Fairhall (*7*) observed a slow initial increase in the blood calcium of dogs following exposure to ultraviolet radiation over a period of months with a return to normal after repeated exposure. Klein (*8*) stated that 20,000 to 100,000 times the daily dose of irradiated ergosterol necessary to cure rickets when fed to albino rats caused 50 percent greater increase in blood calcium than that of the controls. Conversely Taylor and Weld (*9*) found that with either the oral or subcutaneous administration of irradiated ergosterol there was a temporary fall in serum calcium followed by a rise. In a parathyroidectomized animal subcutaneous administration of one dose of ergosterol was followed by a further drop in calcium. Holmquist (*10*) noted that human blood calcium is highest at night during sleep when body temperature and blood adrenaline are lowest.

On the other hand serum calcium values were found by Mull and Bill (*11*) to be constant in women on a minimum diet, on a standard hospital diet, and on a freely selected diet. A variation of only 0.17 mg. per 100 cc. of serum was apparent under these conditions. Furthermore no evidence of seasonal variation of the serum calcium level was found. Similarly the investigation of Kirk, Lewis, and Thompson (*12*) showed that no significant variation of serum calcium occurs in men up to 85 years of age. Statistical analysis indicated the variation to be no greater with age classes than the variation within classes.

However, significant changes in serum calcium occur with certain types of disease. The elevated values found in hyperthyroidism and hyperproteinemia and the lowered values found in hypothyroidism, in certain cases of rickets, in osteomalacia, and chronic glomular nephritis are well known. The effects of minor affections upon serum calcium are less well established.

The effect of the administration of various toxic substances upon serum calcium has also been observed in several instances. In general a pronounced degree of toxicity is necessary to produce an effect of this sort. In the case of ethylene glycol observed by Dille (*13*) no effect was observed while McRae (*14*) found that the administration of mercury succinate intravenously to cats at the rate of 2 mg. per kg. of body weight at 15-minute intervals until death intervened produced a marked lowering of serum calcium. Similarly, sodium oxalate lowered the serum calcium values.

The effect of lead absorption upon serum calcium is more obscure than the effect of certain other toxic substances. According to Celcov (*15*) the absorption of lead markedly affects the blood calcium. With

slight amounts of lead absorption very little change in the serum calcium concentration is apparent, but in severe lead poisoning the serum calcium values are very appreciably increased.

In an investigation of the relative toxicity of lead compounds by Fairhall, Sayers, and Miller (*16*) the blood calcium value was found to fluctuate around the normal values for guinea pigs in all cases where the animals were exposed to lead or its compounds either by ingestion or by inhalation. No significant departure from the normal was apparent in any case. Other experiments (*17*) have indicated the possibility of a slight depressing action of lead absorption upon serum calcium. It was therefore felt necessary to subject the whole matter to a more searching investigation.

EXPERIMENTAL PROCEDURE

Four series of experiments were made, using white rats as experimental animals. In the first set of experiments the animals were given large doses of lead chloride (200 mg. per animal per day) over a period of 4 months in order to poison the animals severely. A similar group of control animals received the same diet but no lead chloride. At the end of the experimental period the animals were etherized and the blood obtained directly from the heart. The blood was transferred to a centrifuge tube, allowed to clot, and a measured amount of the clear serum analyzed for calcium by a slight modification of Kramer and Tisdall's method (*18*).

The values obtained in this experiment are shown in table 1. The average serum calcium value for the lead poisoned animals was 9.9 mg./100 cc. and is identical with that of the control group. Furthermore the individual variation is insufficient to indicate any significant

TABLE 1.—*Calcium content of the blood serum of rats following the daily ingestion of 200 mg. of lead chloride for 120 days*

Leaded animals		Controls		Leaded animals		Controls	
Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.	Number	Serum calcium mg. per 100 cc.
1	10.4	21	9.8	11	9.0	31	10.1
2	9.8	22	9.5	12	10.2	32	9.8
3	9.6	23	10.5	13	9.7	33	9.8
4	9.8	24	10.4	14	10.4	34	10.0
5	10.3	25	10.1	15	9.1	35	10.0
6	10.0	26	10.2	16	9.7	36	9.7
7	9.7	27	9.1	17	9.5	37	9.8
8	9.7	28	9.9	18	9.6		
9	9.5	29	10.3	19	10.8		
10	9.8	30	9.7	20	10.8		
				Average	9.9		9.9

trend within the two groups. Since analyses of the bones of representative animals in this group indicated that a notable amount of lead had been stored, it appears that marked absorption does not affect the blood lead.

EFFECT OF DIETARY VARIATION OF CALCIUM

Three groups of rats were placed on a diet which contained similar amounts of lead carbonate but varied with respect to its calcium content. The diet was so arranged that each animal ingested approximately 12 mg. of lead carbonate per day.

In the first group the calcium content of the food was 0.1 percent, in the second group 0.25 percent, and in the third group the calcium content was 0.56 percent. A set of control animals was also maintained at each calcium level. Each of these groups was kept on its respective diet for one year. At the end of that time the animals were sacrificed and their serum calcium content determined as indicated above. The data from these experiments are given in table 2.

TABLE 2.—*Serum calcium values of rats receiving approximately 12 mg. of lead carbonate per day for 1 year at various levels of calcium diet*

Low calcium group				Medium calcium group				High calcium group			
Leaded animals		Controls		Leaded animals		Controls		Leaded animals		Controls	
Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)	Weight of animals	Calcium (mg. Ca/100 cc. serum)
346	9.6	178	9.9	258	10.0	224	10.3	388	9.8	240	10.0
242	9.3	265	9.9	340	10.2	202	10.5	328	9.9	200	9.7
382	10.2	255	10.1	220	10.2	330	9.3	270	10.5	220	9.9
252	10.0		9.8	182	9.8	229	9.9	236	10.2		10.1
240	10.0	220	9.5	284	10.2	248	9.7	264	9.6	206	9.4
218	9.7	185	10.5	260	10.1	205	9.7	380	10.0	198	10.3
480	10.6	215	10.0	244	10.4	272	9.4	220	9.9	202	9.8
	9.9	210	10.5	277	10.0	252	9.8	220	10.2	220	9.7
	9.9		9.8	330	10.2	216	9.1	248	10.0	240	10.0
	10.1		9.8	160	10.0	254	9.5	270	9.4	340	9.6
324	10.5		9.9	155	10.0	256	9.4	340	9.6	316	9.2
360	10.0	255	9.7	220	9.7	240	9.3	236	9.0	254	9.2
204	9.6	185	9.7	244	9.3	236	10.5	128	9.7	195	9.6
252	9.7	200	10.1	196	10.0	216	10.3	244	10.1	304	9.6
236	10.0	220	9.6	260	9.8	255	9.7	228	10.3	244	9.4
373	10.0	250	10.2	170	9.8	220	9.8	288	10.1	360	9.3
180	9.9	242	9.4	236	10.3	208	10.3	108	9.7	334	9.6
260	10.1	180	9.7	218	10.2	180	9.7	320	10.2	252	9.3
250	9.9	248	9.8	200	10.1	250	10.4	244	10.3	290	9.2
290	10.4	210	10.8	184	9.2	240	9.8	268	9.9	264	9.6
208	10.0	270	10.5	298	9.9	236	9.8	245	9.9	320	9.2
220	9.2	220	10.2	190	10.2		10.1	268	10.0		
218	9.8	218	10.2	250	9.6		9.8	211	10.0		
278	9.3	265	10.1	260	10.4		9.7	228	10.0		
216	10.0	235	10.3	224	9.8		9.6	216	9.0		
220	9.6	215	10.0	220	9.6			184	9.2		
204	9.5			276	10.1			220	10.0		
244	9.3			210	9.0			236	9.4		
236	9.6			268	9.8			271	9.6		
276	9.1			214	9.3			180	9.9		
188	9.7			236	9.3			300	9.2		
216	9.7			236	9.6			144	9.6		
260	9.6			260	9.1			216	9.6		
204	9.9			248	9.6			226	9.8		
248	9.8			176	9.0				9.7		
336	9.6			165	9.2				9.6		
238	9.4			296	10.5				9.7		
				200	9.1						
Average	9.8		10.0		9.8		9.8		9.8		9.6

The average value obtained for serum calcium in the low calcium group of leaded animals was 9.8 mg. Ca/100 cc. serum, compared

with 10.0 mg. Ca/100 cc. sérum in the corresponding control group; in the medium calcium group the average serum calcium was 9.8 mg./100 cc. serum compared with 9.8 mg./100 cc. serum in its accompanying control group; and in the high calcium group the average serum calcium value for the leaded animals was 9.8 mg. Ca/100 cc. serum, as compared with the value 9.6 mg. Ca/100 cc. serum for the high calcium control animals.

There is therefore but little difference in the average figures in these several groups and furthermore there is insufficient variation within any given group to indicate that the absorption of lead on either a high or a low calcium diet appreciably affects the serum calcium level.

SUMMARY

Investigation of the serum calcium content of animals ingesting large amounts of lead as well as animals receiving smaller doses over a longer period of time at different levels of calcium intake indicates that lead absorption does not appreciably affect the blood calcium level.

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INFECTION IN MONKEYS WITH STRAINS OF *TRYPANOSOMA CRUZI* ISOLATED IN THE UNITED STATES [1]

By DORLAND J. DAVIS, *Passed Assistant Surgeon, United States Public Health Service*

Indigenous American human trypanosomiasis (Chagas' disease) has not been recognized yet in the United States, although it has been known since 1933 (*1*) that *Trypanosoma cruzi*, the cause of the disease in Central and South America, commonly infects native species of *Triatoma*, or cone-nosed bugs. The question whether or not strains of *T. cruzi* present in this country are capable of causing the disease in man can be decided only if human infection is proved.

One of the common clinical signs of American trypanosomiasis as it is seen by clinicians (*2*, *3*) in South America is a unilateral bipalpebral edema lasting several weeks. This is believed to represent a site of inoculation and to be caused by contamination of the ocular tissues with infective fecal material from insects. Romano (*4*) has reproduced this lesion in monkeys by dropping into the eye fresh fecal dejecta from a bug infected in the laboratory with a South American strain.

Although Wood (*5*) and Packchanian (*6*) have reported infecting monkeys with strains of *T. cruzi* isolated in the United States, no one has reported infecting this animal by dropping directly into the eye fecal material from infected native triatomids. Since the ocular route is probably a natural way of infection in man, it seemed important to determine whether United States strains of this trypanosome were capable of infecting monkeys by this avenue.

Strains of *T. cruzi* isolated from human cases in Panama [2] and Venezuela [3] were inoculated into monkeys to serve as a control for the native strains. However, the strains could not be compared fairly in this study because the human strains were not freshly isolated, and the number of experimental animals was too small.

Arrangements were made to have live specimens of *Triatoma* mailed to this laboratory. Of those sent, three specimens of *T. gerstaeckeri* [4] collected in Texas and one specimen of *T. protracta* [5] collected in California were found to harbor crithidia and metacylic

[1] From the Division of Infectious Diseases, National Institute of Health.
[2] This strain was supplied by Dr. C. M. Johnson, Gorgas Memorial Laboratory, Panama.
[3] This strain was furnished by Dr. Felix Pifano, Instituto Nacional de Higiene, Caracas, Venezuela.
[4] These specimens were collected by Theodore McGregor, Entomologist of the Bureau of Laboratories, Texas State Health Department.
[5] This specimen was collected by S. T. Shaw, Plymouth, Calif.

forms of trypanosomes in the intestinal tract. In addition to these insects, laboratory-reared triatomids (*Triatoma gerstaeckeri* and *T. longipes*, natural carriers of *T. cruzi* in the United States) were infected by allowing them to feed on desert mice (*Peromyscus eremicus*) infected with strains of *T. cruzi* isolated from a specimen of *Triatoma gerstaeckeri* from Texas (Texas strain A) and from human cases in Venezuela and Panama.

TABLE 1.—*Data concerning monkeys infected with strains of* T. cruzi *isolated from* Triatoma *sp. in the United States*

Monkey No.	Source of strain inoculated	Days after inoculation trypanosomes present in blood	Highest temperature ° C.	Days after inoculation eye lesion present	Histopathology	Remarks
2200	*T. protracta* No. 36 from California	19–58	40.4	17–24	No examination	Observed for 191 days.
2201	do	30–(46)	39.8	No lesion.	Leishmania forms in heart muscle.	Sacrificed on 46th day.
2217	Laboratory-reared specimen of *T. gerstaeckeri* infected with Texas strain A.	21–51	40.7	do	Leishmania forms in heart muscle, myocarditis.	Died on 90th day.
2218	do	14–36	40.5	14–25	No examination	Crithidia forms in fluid from edematous eyelid. Observed for 169 days.
2226	*T. gerstaeckeri* No. 115.9 from Texas.	15–38	41.0	No lesion.	do	Observed for 163 days.
2227	*T. gerstaeckeri* No. 116.6 from Texas.	15–38	41.4	do	do	Do.
2265	*T. gerstaeckeri* No. 44 from Texas.	14–49	40.0	13–17	Leishmania forms in heart muscle.	Died on 53rd day.

Data concerning monkeys infected with strains of T. cruzi *isolated from human cases*

2262	Laboratory-reared specimen of *T. longipes* infected with Panama strain.	19–49	40.3	17–(36)	Leishmania forms in eyelid on 20th day.	Biopsy of eyelid. Observed for 98 days.
2263	Laboratory-reared specimen of *T. longipes* infected with Venezuela strain.	19–56	39.9	No lesion.	No examination	Do.
2264	do	14–56	40.4	do	do	Do.

Ten young, tuberculin-negative monkeys (*Macacus mulatta*) weighing about 7 pounds were inoculated by dropping into one eye the expressed fecal material of an infected bug. The animals were not anesthetized and the ocular tissues were not scarified or injured in any way. Five monkeys were inoculated with fecal material from naturally infected triatomids collected in the United States and five with material from the bugs infected in the laboratory, two of which were infected with a Texas strain and the other three with the human strains.

Trypanosomes morphologically similar to *T. cruzi* were found in the blood of all the monkeys inoculated, and were present as early as the fourteenth day after inoculation in three animals and the fifteenth day in two. Examination of the blood every 3 to 4 days demonstrated their presence until the thirty-eighth to fifty-eighth day. The usual number of trypanosomes per 100 microscopic fields (4mm. x 10X) in fresh blood smears was about five during the height of the infection. The largest number found was 120 per 100 fields in the blood of monkey No. 2265 on the thirty-third day after inoculation. All of the monkeys had an elevation of temperature during most of the time trypanosomes were present in the blood.

Three (Nos. 2200, 2218, 2265) of seven monkeys inoculated with United States strains and one (No. 2262) of three inoculated with strains from known human sources developed bipalpebral edema in the same eye in which the infected material was placed. This edema first was noticed from the thirteenth to the seventeenth day after inoculation and in 2 or 3 days had reached the maximum swelling. The lids, especially the lower, were swollen and firm, and the skin was reddish purple in color. There was moderate inflammation of the palpebral conjunctivae. No chemosis, bulbar conjunctivitis, or dacryoadenitis was apparent. None of the animals had palpable preauricular or cervical lymph nodes. The swelling and discoloration gradually disappeared after lasting 4, 7, and 11 days in the three animals on which biopsies were not done.

At the time of maximum swelling of the lower lid of monkey No. 2262 a biopsy was performed. Histological examination[6] of the tissue sections showed fibroblast proliferation and focal infiltration, chiefly perivascular, by lymphocytes, plasma cells, and large mononuclear cells. The leishmania forms of the parasite were found near a focus of infiltration.

Saline was injected into the tissues of the swollen lower lid of monkey No. 2218, withdrawn, and examined microscopically. Two motile crithidia forms were found in the fluid.

These studies did not clarify the reason for the development of the eye lesion in some animals and its absence in others.

Complement fixation tests (7), using an antigen made with the Panama strain, were done on the serums taken from all 10 animals before they were inoculated and at weekly or bimonthly intervals for several months after infection. The serums taken before inoculation were negative, but 4 to 6 weeks later all the serums fixed complement in significant dilutions.

Seven of the animals remained alive, one was sacrificed, and two died during the time of observation. Beginning about 60 days after

[6] Histopathological examinations were done by Assistant Surgeon (R) Benjamin Highman, Division of Pathology, National Institute of Health.



FIGURE 1.—Monkey No. 2218 with bipalpebral edema 16 days after fecal material from a triatomid infected with a strain of *T. cruzi* from Texas had been dropped in the left eye.

inoculation with a Texas strain of trypanosomes, monkey No. 2217 became increasingly emaciated, and was found dead on the ninetieth day. Trypanosomes had not been found in its blood after the fifty-first day. At autopsy the organs were, grossly, normal in appearance and size, and no evidence of tuberculosis or enteritis was found. Histopathological examination revealed a mild diffuse myocarditis with round cell infiltration and numerous leishmania forms in the heart muscle fibers.

Monkey No. 2265 was found dead 53 days after inoculation with a fresh Texas strain. One week before death, the animal was noticed to have diarrhea and to be emaciated. Many trypanosomes had been found in its blood since the fourteenth day, but examination 3 days before death revealed no trypanosomes, although a desert mouse inoculated with blood taken on that day became infected. From the thirteenth day until the seventeenth day the eye in which the infected dejecta was placed showed bipalpebral edema and discoloration. At autopsy the organs were, grossly, normal in appearance and size. Tissue sections of the heart showed a slight patchy round cell infiltration, and a few muscle fibers contained leishmania forms. No abnormalities were found in either monkey except those described; however, it is not certain that the trypanosome infection caused the death of the animals.

Monkey No. 2201 was sacrificed on the forty-sixth day after inoculation, and the autopsy revealed no gross abnormalities of the organs. In tissue sections of the heart a slight patchy diffuse and dense focal infiltration by lymphoid cells as well as groups of leishmania forms were present. There was slight patchy subepithelial infiltration by lymphoid cells in the eyelid that had been the site of inoculation.

SUMMARY

All of five monkeys became infected with *Trypanosoma cruzi* when fecal material from infected specimens of *Triatoma* collected in Texas and California was dropped directly onto the intact ocular tissues. Two monkeys were infected by the same route with fecal material from laboratory-reared triatomids infected with a Texas strain. Three monkeys were infected similiarly with strains of *T. cruzi* from human cases.

Three of the seven monkeys inoculated with United States strains and one of three inoculated with strains from known human sources developed bipalpebral edema at the site of inoculation

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SALMONELLA ENTERITIDIS: EXPERIMENTAL TRANSMISSION BY THE ROCKY MOUNTAIN WOOD TICK *DERMACENTOR ANDERSONI* STILES [1]

By R. R. Parker, *Director*, and Edward A. Steinhaus, *Associate Bacteriologist*, *Rocky Mountain Laboratory, United States Public Health Service*

During the year 1940 several of the guinea pig passage strains of rickettsiae maintained at the Rocky Mountain Laboratory became contaminated with *Salmonella enteritidis*.[2] In an attempt to purify a strain of Rocky Mountain spotted fever, normal adult *Dermacentor andersoni* were permitted to ingest blood from a passage animal. This was done with the hope that the ticks would subsequently transmit the spotted fever rickettsia but not the contaminating bacterium. However, in each of two experiments the test ticks acquired both disease agents and subsequently transmitted *S. enteritidis* to successive guinea pigs on which they were permitted to feed.

In the first experiment 10 adult ticks fed on a passage guinea pig for 2 days and then successively on 2 normal animals for the same period at intervals of 10 and 7 days, respectively. *S. enteritidis* was cultured from the blood of the second animal 4 days, and from that of the third 22 days after the removal of the ticks. This series of observations was interrupted because the ticks eventually refused to feed.

In the second experiment 15 normal male and female ticks were fed for 3 days on a strain guinea pig and after being held at room temperature for 35 days were allowed to feed on a normal guinea pig. At the end of the feeding period, *S. enteritidis* was isolated in pure culture from the heart blood of this animal. The ticks were successively fed on 5 more guinea pigs at intervals of 6, 0, 1, 9, and 7 days, respectively. *S. enteritidis* was recovered from the host guinea pig in all but one instance. This exception was the third

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

[2] The identity of this strain was confirmed by Dr. P. R. Edwards (University of Kentucky).

guinea pig of the series, the blood of which was not cultured until after the febrile period. Its temperature record suggested that this animal was also infected.

During the course of this experiment, 4 partially fed female ticks were examined for *S. enteritidis*. Each harbored the bacterium in large numbers. On four occasions the feces from the feeding ticks were inoculated into normal guinea pigs, all of which developed typical *S. enteritidis* infections.

The pertinent data for experiments 1 and 2 are given in table 1.

TABLE 1.—*Tests of adult* Dermacentor andersoni *for transmission of, and occurrence of,* Salmonella enteritidis. *Compilation of data with respect to the host guinea pigs*

Guinea pig	Date ticks attached	Date ticks removed	Number of ticks used	Number of live and dead[1] ticks removed	Date blood examined for *S. enteritidis*	*S. enteritidis* present in blood	Number of ticks tested individually for *S. enteritidis*	*S. enteritidis* present in ticks	*S. enteritidis* present in tick excreta
Experiment 1									
A69191[2]	Sept. 25, 1940	Sept. 27, 1940	10	10		+			
A71891	Nov. 7, 1940	Nov. 9, 1940	10	3 (7)	Nov. 13, 1940	+			
A72442[3]	Nov. 16, 1940	Nov. 18, 1940	3	3	Dec. 10, 1940	+			
Experiment 2									
A69245[2]	Sept. 27, 1940	Sept. 30, 1940	15	15		+			
A71892	Nov. 4, 1940	Nov. 9, 1940	15	7 (8)	Nov. 9, 1940	+			
A72443[3]	Nov. 15, 1940	Nov. 18, 1940	7	7	Nov. 22, 1940	+			+
A72533[3]	Nov. 18, 1940	Nov. 25, 1940	7	6 (1)	Jan. 7, 1941	?[4]	[5]2	+	
A72745[3]	Nov. 26, 1940	Dec. 3, 1940	5	5	Dec. 3, 1940	+			+
A73711[3]	Dec. 12, 1940	Dec. 21, 1940	5	5	Dec. 20, 1940	+			+
A74454	Dec. 28, 1940	Jan. 6, 1941	5	2 (3)	Jan. 3, 1941	+	2	+	+

[1] Figures in parentheses indicate dead ticks.
[2] A69191 and A69245 were Rocky Mountain spotted fever strain pigs; these animals and those of several previous passages were infected concurrently with *Salmonella enteritidis*.
[3] Heart blood was bacteriologically sterile at time ticks were placed on guinea pigs.
[4] Blood probably cultured too late to recover *S. enteritidis*.
[5] One of these ticks had died during feeding.

In another experiment the eggs and progeny of two groups of infected female ticks were tested. The tests for one group were all negative. The larvae and nymphs from the other group infected the guinea pigs on which they engorged and the bacterium was cultured from the larvae. Tests of egg samples and of the adult ticks were negative.

Of the guinea pigs to which the ticks were serially transferred in experiments 1 and 2, heart blood was cultured and found bacteriologically sterile from the second animal thus used in the first experiment and from the second, third, fourth, and fifth ones used in the second experiment (see table). As a further precautionary measure against the possibility of using guinea pigs that might already be infected, the test animals were selected, immediately following delivery, from animals from local dealers known to have healthy stock.

To guard against the acquisition of infection from another animal during the course of the experiments, the guinea pigs were not only strictly isolated in a building in which there were no other animals of any kind, but each guinea pig was kept in a separate can.

SUMMARY AND DISCUSSION

The data presented show that when *Salmonella enteritidis* is ingested by the Rocky Mountain wood tick *Dermacentor andersoni* the bacterium survives in the tick and can be transmitted by it, that possibly it may be passed on occasionally through the egg to the active stages of the next generation, and that the tick excrement is infectious.

The fact that this tick can transmit the infection as long as 35 days after an infective blood meal suggests that transmission may not be mechanical. However, it is also possible that it results from contamination of the skin or the bite wound with infectious tick excrement. The data further indicate that *S. enteritidis* is rather frequently fatal to ticks.

S. enteritidis is the second bacterium shown to be transmissible by *D. andersoni*. The first was *Pasteurella tularensis* (Parker, Spencer, and Francis (*1*)). Spontaneous infection with *P. tularensis* of *D. andersoni* and other ticks (*D. variabilis* and *Haemaphysalis leporis-palustris*) is now well established, and all three species are recognized carriers of the tularemia organism in nature and the two dermacentors to man.

It appears possible that *S. enteritidis* occasionally occurs spontaneously in *D. andersoni*. Several times in the past, ticks from nature under test for the presence of infectious agents have been suspected of being responsible for initiating outbreaks of *S. enteritidis* in guinea pigs, but it was never certain whether the bacterium was resident in the ticks or in the guinea pigs. In one such instance the suspected ticks were *Rhipicephalus sanguineus*.

Huang, Chang, and Lien (*2*) have reported the isolation of *S. enteritidis* from body lice taken from patients ill with proved *S. enteritidis* infections.

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(*2*) Huang, C. H., Chang, H. C., and Lien, V. T.: Salmonella infection. A study of 17 cases of *S. enteritidis* septicemia. Chinese Med. J., **52**: 345–366 (1937).

REPORT ON THE FLEAS *OPISOCROSTIS BRUNERI* (BAKER) AND *THRASSIS BACCHI* (ROTHS.) AS VECTORS OF PLAGUE

By FRANK M. PRINCE, *Assistant Entomologist, United States Public Health Service*

It is well established that plague is transmitted under experimental conditions by the bites of fleas of a number of different species, and it is probable that those of other species are unable to convey the infection in this manner. Eskey and Haas (*1*) investigated 20 species among 31 collected from several western States to determine their capacity as vectors and accomplished successful results with 15, but were unsuccessful with 5 species. These observations become of much importance when the infection is found in an area, and the likelihood of its dissemination to adjacent or more remote areas must be considered.

During the fall of 1941, plague was found in each of four lots of fleas collected from Richardson's ground squirrels (*Citellus richardsonii richardsonii* (Sabine)) of Divide County, N. Dak. This constituted the first evidence of the disease in the Plains States, and it was essential to learn promptly whether there were suitable hosts and parasites which would foster its spread to sections of the country which lie further east. Richardson's ground squirrel is a susceptible host whose range extends eastward beyond Divide County, and specimens of it have been found infected with plague in each of several areas west of North Dakota. The lots of fleas collected from these animals in North Dakota included those of three species (*Opisocrostis t. tuberculatus* (Baker), *O. labis* (J. & R.), and *Oropsylla rupestris* (Jordan)) whose capacity as vectors had been previously determined (*1*), and also included those of one species, *Thrassis bacchi* (Roths.), which had not been investigated. *T. bacchi* was originally described as a parasite of *Citellus tridecemlineatus* (Mitchill), which was taken in Alberta, Canada, (*2*) and it has been subsequently found on the same species of squirrel in El Paso County, Colo. (*3*). It has been collected with specimens of the three species mentioned by field units of the United States Public Health Service from Richardson's squirrel of northeastern Montana, and from both Richardson's and 13-striped squirrels (*C. tridecemlineatus*) of North Dakota, as far east as Rolette County, the limit of the author's observations.

Opisocrostis bruneri (Baker), the second species included in this study, was described as a parasite of Franklin's ground squirrel (*Citellus franklinii* (Sabine)) and the 13-striped ground squirrel in Lincoln, Nebr., (*4*) and has been reported in collections from one or both of these squirrels of Colorado, Minnesota, Iowa, Illinois, and Wisconsin (*5*) and from *Citellus* sp. of Montana (*6*). Although specimens of *O. bruneri* were not included among the fleas taken at Divide County, N. Dak., large numbers of them, and of *T.*

bacchi, were collected from Richardson's, Franklin's, and 13-striped ground squirrels of Potter, Brown, and Spink Counties, S. Dak., by the Public Health Service. Attention was attracted to *O. bruneri* and its capacity as a vector because other species of this genus are efficient vectors and infest the same ground squirrel species, also because the geographical distribution of *O. bruneri* overlaps that of the species mentioned above and extends as far east as Illinois.

The author assisted with the investigations of Eskey and Haas (*1*) and has adopted their methods, with some desirable amendments, in the tests which are the subject of this report.

In Potter County, S. Dak., 42 *O. bruneri* and 40 *T. bacchi* were collected from Richardson's ground squirrels and their nests, and were forwarded by mail to the laboratory at San Francisco, Calif. where they were promptly fed on healthy guinea pigs. They were then held without food for a period of 48 hours, divided into two lots, and each lot was placed on a plague-infected guinea pig and allowed to remain with it until its death 2 hours later. No further opportunities were given to obtain the infection. A microscopic preparation was made of the heart blood of the infected animals just previous to their death, and 10 or more *Pasteurella pestis* were found in each of several microscopic fields examined. Experience has shown that this degree of bacteriemia affords a good opportunity for the feeding fleas to become infected. Each flea of both lots was then placed in a test tube and held at a mean temperature of 60° F., with minimum and maximum variations of from 44° to 76° F. After the single opportunity to feed on the infected guinea pig, each flea was fed on the clipped abdomen of a healthy guinea pig, at intervals of 2 to 3 days, throughout the remainder of its life, or until the experiment ended 75 days later. At the time of its death, each flea was examined for infection, by triturating it in normal saline solution and injecting the triturated suspension into a healthy guinea pig.

The shortest period through which feedings on normal animals were offered before transmission of the infection was accomplished was 3 weeks. In the meanwhile, 12 *O. bruneri* and 17 *T. bacchi* had died. The deaths occurred as early as the second day after the opportunity to obtain an infectious meal, and continued at intervals throughout the 75 days of the experiment. Three fleas survived until the end of the period and were then killed and examined. Consequently, the opportunities to effect transmission were not equal among all of the fleas, and no exact percentage of those which were capable of transmitting the infection can be estimated.

However, 8 *O. bruneri* and 10 *T. bacchi* became infected, and were infectious at the time of their death. It is quite probable that others became infected also, but subsequently cleared themselves through the repeated feedings on healthy guinea pigs, since Eskey and Haas

(*1*) concluded from their experience that as many as 19 percent of those of some species clear themselves by this means.

The first successful transmission was accomplished on the twenty-first day after the original feeding on the infected guinea pig, and the latest occurred on the thirty-fourth day. Four of the 8 infected *O. bruneri* and 4 of the 10 infected *T. bacchi* transmitted the infection to healthy animals. In other words, 50 percent of the *O. bruneri* and 40 percent of the *T. bacchi* which had become infected were successful as vectors. Two fleas died on the seventieth day and were infected, but neither had transmitted the disease, although they had had repeated opportunities to do so. The periods between the date

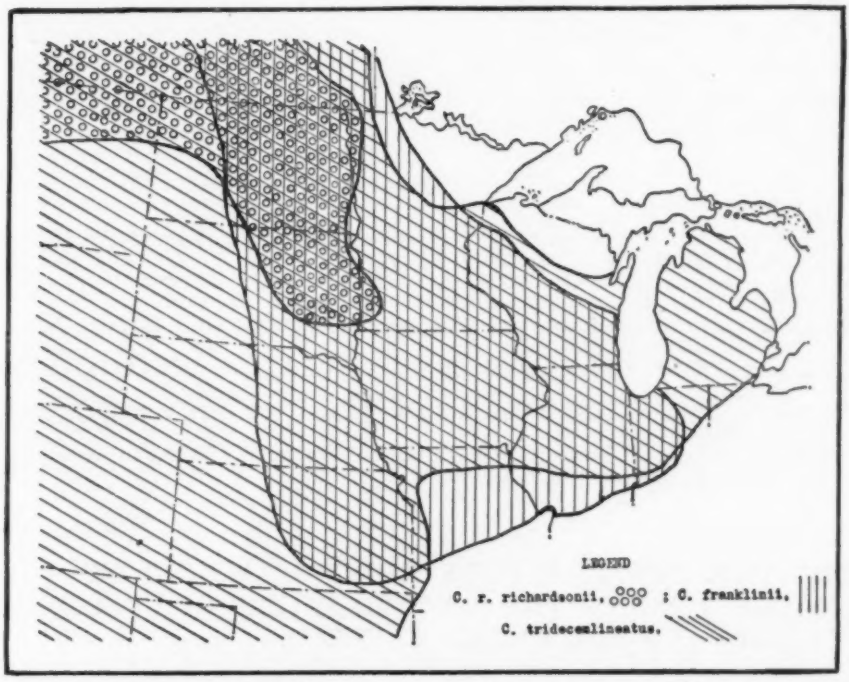


FIGURE 1.—Distribution of *Citellus richardsonii richardsonii*, *C. franklinii*, and *C. tridecemlineatus*. (Revised from Howell.)

on which the respective fleas had the opportunity to become infected with plague and that on which they transmitted it were as follows: *O. bruneri*, 21 days, 30 days, 33 days, and 34 days; and *T. bacchi*, 23 days, 27 days, 29 days, and 32 days.

When these results are compared with those obtained under similar conditions with the rat flea (*Xenopsylla cheopis* (Roths)) and the California ground squirrel flea (*Diamanus montanus* (Baker)), which are generally regarded as highly efficient vectors, *O. bruneri* and *T. bacchi* may be regarded as equally capable vectors.

The significance of the possible role of these vectors in North and South Dakota in the dissemination of plague eastward becomes more apparent when the ranges of their three hosts are considered.

Richardson's ground squirrel is prevalent in areas which extend from western Montana to the western boundary of Minnesota, thence southward to a point near the northern boundary of Iowa. Franklin's ground squirrel is prevalent in North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, northern Missouri, Wisconsin, Illinois, and northwestern Indiana. Its range overlaps that of Richardson's ground squirrel, and the range of each of these is in turn overlapped by the 13-striped ground squirrel (fig. 1). Thus, a continuous chain of fleas capable of the transmission of plague, and of hosts which have been found infected or of others which are very probably susceptible to infection, extends from the Rocky Mountain States and western North Dakota, in which plague prevails, to the States east of the Mississippi River.

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THE TICK *ORNITHODOROS RUDIS* AS A HOST TO THE RICKETTSIAE OF THE SPOTTED FEVERS OF COLOMBIA, BRAZIL, AND THE UNITED STATES [1]

By Gordon E. Davis, *Senior Bacteriologist, United States Public Health Service*

The report of spotted fever in an epidemic form in a restricted area in Tobia, Colombia (Patiño, Afanador, and Paul, 1937), is of considerable interest inasmuch as spotted fever in the United States and in Brazil is endemic in character.

The presence of the argasid tick *Ornithodoros rudis* (= *O. venezuelensis* Brumpt) suggested a possible role for this tick in transmission, as another species of the genus, *O. parkeri*, is effective in the experimental transmission of spotted fever of the United States (Davis, 1939).

[1] Contribution from the Rocky Mountain Laboratory of the Division of Infectious Diseases, National Institute of Health.

In October 1940 and June 1941, specimens of *O. rudis* which had engorged on guinea pigs ill with the Colombian disease were sent by Dr. Luis Patiño, Director of the Instituto Federico Lleras at Bogotá, to the Rocky Mountain Laboratory. Strains were established by the injection of a part of each lot into guinea pigs. With these strains and the progeny of one female from the first shipment, 16 transmission experiments have been carried out by test feedings and subsequently by test injections of ticks engorged on infected guinea pigs. Two similar experiments with the spotted fevers of Brazil and the United States are also reported. Laboratory strains of Rocky Mountain spotted fever were used for immunity tests. All injections were given intraperitoneally.

TABLE 1.—*Spotted fever of Colombia: transmission experiments with* Ornithodoros rudis

Experiment number	Date of infective feeding	Number of ticks	Number of test feedings	Tests by injection			F1 generation
				Number of days after infective feeding	Number of ticks	Results	
1	Dec. 28, 1940	6	5	343	1	Positive	
2	Feb. 7, 1941	16	5	185	5	do	161 ticks negative by feeding; 96 of these negative by injection.
				207	8	do	
3	Feb. 12, 1941	22	5	202	10	Negative	
				255	2	do	
4	Mar. 5, 1941	16	2 to 4	234	2	Positive	
5	Mar. 6, 1941	13	2 to 4	319	2	do	
6	Mar. 11, 1941	25	5	230	11	do	232 ticks negative by feeding; 139 of them positive by injection as first nymphs.
7	May 2, 1941	13	2	146	3	do	
8	May 29, 1941	75	3	93	6	do	
				96	42	do	
				146	5	do	
9	June 6, 1941	38	3	88	22	Negative	
				136	10	do	
10	June 7, 1941	25	3	87	20	Positive	
11	June 8, 1941	25	3	86	25	do	
12	June 17, 1941	38	1 to 2	77	23	do	
13	June 18, 1941	36	2	73	32	do	
14	Aug. 12, 1941	70	2 to 3	21	5	Negative	
				40	39	do	
15	Aug. 13, 1941	52	1 to 2	0	5	do	
				3	5	Positive	
				69	28	do	
16	As received.	16	4	70	2	do	
				101	1	do	

SPOTTED FEVER OF COLOMBIA

Using from 6 to 75 ticks for the infective feedings, 16 attempts were made to transmit the rickettsia of Colombian spotted fever by subsequent feedings on guinea pigs. All ticks were given from one to five test feedings but in no instance did the host become infected. In experiments 4 and 5 the same host was used for the infective feeding of two lots of ticks: in experiments 9, 10, and 11 one host was used for three lots, and in experiments 12 and 13, and 14 and 15, one host,

respectively, was used for each of two lots. Ticks used in experiments 3, 9, and 14 were found noninfective when subsequently injected. Samples from all other experimental lots injected from 3 to 343 days following the infective feeding caused typical infections. In experiment 6, ticks of the F1 generation were also infective when injected as first nymphs 98 days following the larval feeding.

SPOTTED FEVER OF BRAZIL

In similar attempts to transmit the spotted fever of Brazil, 22 and 25 ticks, respectively, were given an infective feeding on the same host. These ticks failed in transmission at four successive test feedings but were shown to harbor the rickettsia when injected after 191 and 190 days. Progeny resulting from the first oviposition were noninfective by feeding and by subsequent injection.

TABLE 2.—*Spotted fever of Brazil: transmission experiments with* Ornithodoros rudis

Experiment number	Date of infective feeding	Number of ticks	Number of test feedings	Tests by injection			F1 generation
				Number of days after infective feeding	Number of ticks	Results	
1	Oct. 18, 1941	22	4	128	7	Positive	76 ticks; no infection by feeding or by injection.
				191	6		
2	Oct. 19, 1941	25	4	127	9	do	80 ticks; no infection by feeding or injection.
				190	4		

SPOTTED FEVER OF THE UNITED STATES

Twenty-six larvae (Paraguay stock [2]) and 21 (Colombian stock) were given an infective feeding and the following day 22 larvae (Paraguay stock) and 16 (Colombian stock) engorged on the

TABLE 3.—*Spotted fever of the United States: transmission experiments with* Ornithodoros rudis

Experiment number	Infective feeding	Number of ticks	Number of test feedings	Tests by injection		
				Number of days after infective feeding	Number of ticks	Results
1	Apr. 7, 1941	47	4	243	30	Positive.
2	Apr. 8, 1941	38	4	242	22	Do.

[2] The Paraguay stock was received from Dr. E. Dias from the collection of Dr. H. de B. Aragão, of the Oswaldo Cruz Institute, Rio de Janeiro, Brazil, under the name *O. migonei* Brumpt 1936. This name has been made a synonym of *O. rudis* (Cooley, 1942).

same guinea pig. Four test feedings failed to cause infections in the host guinea pigs. Ticks from each lot tested by injection at 243 and 242 days, respectively, following the infective feeding caused a typical febrile reaction with scrotal edema and subsequent immunity in one guinea pig and 11 days of fever with extensive scrotal sloughing and death on the fifteenth day in the other.

DISCUSSION

Ixodid ticks that require several days for engorgement may remain on the infected host throughout the entire febrile period and thereby acquire any infectious agent present in the circulating blood at any time during this period. On the other hand, species of *Ornithodoros* that engorge in less than 30 minutes have a lesser chance of acquiring the infectious agent unless this short feeding period is coincident with the presence of the specific organism in the ingested blood. This is demonstrated in experiments 9, 10, and 11 on Colombian spotted fever, where one guinea pig was used as the infective host on 3 successive days. As judged by the results of subsequent injection, the ticks that fed on the first day failed to acquire the infectious agent while ticks that engorged on the following 2 days were successful. The same was true in experiments 14 and 15.

Although none of the ticks transmitted the disease agents by *feeding* on guinea pigs, ticks from 13 experiments on Colombian spotted fever caused the disease when *injected*, and in one instance (experiment 6) there was transmission through the eggs to the larvae and first nymphs as shown by the injection of the latter. Patiño has recently reported the conservation of the "virus" in *O. rudis* for 123 days. The ticks used in the two experiments on spotted fever of Brazil and two experiments on spotted fever of the United States also caused the respective diseases when injected.

The conservation within *Ornithodoros* ticks of certain infectious agents not transmitted by feeding is not unusual (Brumpt, 1936; Davis, 1939, 1940), but the transmission of such agents through the egg, so far as reported, is less common.

SUMMARY

The causative agents of the immunologically identical spotted fevers of Colombia, Brazil, and the United States are not transmitted by the bite of *O. rudis*.

The causative agent of spotted fever of Colombia was conserved in the tissues of the tick, as shown by injection, for 343 days and is transmissible through the egg to the next generation. Similarly, the agents of the spotted fevers of Brazil and the United States were conserved in the tick for 191 and 243 days, respectively.

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DEATHS DURING WEEK ENDED JUNE 19, 1943

[From the Weekly Mortality Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 19, 1943	Corresponding week, 1942
Data from 90 large cities of the United States:		
Total deaths	8,391	7,683
Average for 3 prior years	7,745	
Total deaths, first 24 weeks of year	233,348	211,629
Deaths under 1 year of age	574	555
Average for 3 prior years	536	
Deaths under 1 year of age, first 24 weeks of year	16,113	13,627
Data from industrial insurance companies:		
Policies in force	65,545,543	64,971,781
Number of death claims	12,646	10,518
Death claims per 1,000 policies in force, annual rate	10.1	8.4
Death claims per 1,000 policies, first 24 weeks of year, annual rate	10.4	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

REPORTS FROM STATES FOR WEEK ENDED JUNE 26, 1943

Summary

The number of reported cases of poliomyelitis increased to 136 during the week, as compared with 99 for the preceding week, 41 for the corresponding week last year, and a 5-year (1938–42) median of 51 for the week. A rather sharp increase has been noted beginning with the week ended June 5. Of the current cases, 58 were reported in California and 39 in Texas, or more than two-thirds in these two States. A total of 894 cases has been reported to date this year—a larger number than for any prior year since 1934. Of the current accumulated total, 293 cases have been reported in California and 160 in Texas, or more than one-half in these two States.

The number of meningococcus meningitis cases increased from 327[1] to 335. Increases were reported in the North Central, East South Central, and Pacific areas. A total of 11,766 cases has been reported to date.

Reports of the other communicable diseases continue favorable. The incidence of the dysenteries, smallpox, and endemic typhus fever is slightly above that for last year, while a new minimum for typhoid fever has been recorded to date this year. The total number of measles cases reported so far this year is above both last year's figure and the 5-year median. Apparently a larger proportion of cases of German measles than usual is being reported this year, at least in certain cities. Reports from several localities indicate an unusual prevalence of rabies in animals.

A total of 8,918 deaths was reported in 88 large cities in the United States during the current week, as compared with 8,275 for the preceding week, and a 3-year average of 7,928. To date, 239,607 deaths have been recorded in these cities, as compared with 216,873 last year.

[1] Corrected figure.

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median

In these tables a zero indicates a definite report, while leaders imply that, although none were reported, cases may have occurred.

Division and State	Diphtheria			Influenza			Measles			Meningitis, meningococcus		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942	
NEW ENGLAND												
Maine	0	0	0	----	----	----	125	48	111	7	1	0
New Hampshire	1	0	0	----	----	----	7	5	9	2	0	0
Vermont	0	0	0	----	----	----	154	131	97	0	0	0
Massachusetts	3	2	2	----	----	----	1,009	676	711	18	12	1
Rhode Island	0	1	1	----	----	----	97	113	87	5	1	0
Connecticut	3	1	1	1	1	1	200	227	227	7	2	0
MIDDLE ATLANTIC												
New York	15	9	13	[1]4	[1]2	[1]2	2,548	996	1,146	45	17	4
New Jersey	4	3	8	4	3	2	1,452	369	369	16	3	1
Pennsylvania	12	6	9	----	1	----	553	325	463	21	6	4
EAST NORTH CENTRAL												
Ohio	5	2	10	1	18	8	357	182	182	12	0	1
Indiana	4	2	3	1	----	1	146	63	63	9	1	1
Illinois	7	17	21	14	18	9	926	130	217	19	1	1
Michigan [3]	9	1	4	4	1	1	1,611	208	508	23	0	0
Wisconsin	0	0	4	9	12	12	1,665	892	954	6	1	0
WEST NORTH CENTRAL												
Minnesota	2	1	1	----	----	----	272	121	91	2	1	0
Iowa	0	1	1	----	----	----	85	193	141	0	0	0
Missouri	2	0	1	----	----	----	99	65	27	17	0	0
North Dakota	1	0	0	36	4	2	68	11	11	1	0	0
South Dakota	0	0	0	----	----	----	50	7	3	0	0	0
Nebraska	1	2	1	----	2	----	97	56	52	1	0	0
Kansas	1	1	4	4	1	----	126	68	123	2	0	0
SOUTH ATLANTIC												
Delaware	0	0	0	----	----	----	19	1	3	1	0	0
Maryland [2]	3	3	3	1	----	2	155	71	79	4	10	2
District of Columbia	0	2	1	----	----	----	60	42	42	2	2	1
Virginia	1	2	6	18	40	17	112	72	167	10	8	3
West Virginia	1	2	4	----	3	3	23	23	23	0	1	1
North Carolina	4	3	7	8	----	----	76	120	192	13	1	1
South Carolina	1	1	4	80	81	108	40	29	29	2	1	1
Georgia	2	4	6	12	14	13	26	42	53	3	0	0
Florida	0	3	3	6	7	4	33	76	45	5	0	0
EAST SOUTH CENTRAL												
Kentucky	3	4	4	2	----	4	42	13	63	3	1	1
Tennessee	5	4	3	6	18	10	66	16	48	4	0	0
Alabama	3	0	2	15	12	9	78	21	72	11	2	2
Mississippi [3]	2	1	1	----	----	----	----	----	----	0	2	1
WEST SOUTH CENTRAL												
Arkansas	3	2	2	1	8	8	22	23	23	4	1	0
Louisiana	3	7	7	1	5	5	13	54	17	1	1	0
Oklahoma	0	2	2	16	7	7	67	25	46	0	1	1
Texas	24	23	23	189	76	80	228	144	174	12	1	1
MOUNTAIN												
Montana	0	2	1	----	----	----	121	74	55	0	0	0
Idaho	0	0	0	5	----	----	74	38	9	6	0	0
Wyoming	0	0	0	7	42	----	49	18	8	0	0	0
Colorado	5	5	7	27	27	3	64	75	75	4	0	0
New Mexico	2	0	1	1	1	----	6	11	12	1	0	0
Arizona	2	0	2	44	14	21	20	34	34	0	0	0
Utah [2]	0	0	0	12	1	----	98	473	204	3	1	0
Nevada	0	0	----	----	----	----	1	19	----	0	0	----
PACIFIC												
Washington	5	0	0	1	1	----	130	247	141	6	1	0
Oregon	2	0	1	2	3	4	59	80	80	3	3	0
California	19	8	15	77	28	28	693	1,968	511	24	29	2
Total	160	127	202	609	451	437	14,022	8,695	8,695	335	112	44
25 weeks	5,983	6,178	7,629	76,886	77,756	166,266	499,064	444,331	444,331	11,766	1,967	1,175

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Poliomyelitis			Scarlet fever			Smallpox			Typhoid and paratyphoid fever		
	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42	Week ended		Median 1938–42
	June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942		June 26, 1943	June 27, 1942	
NEW ENGLAND												
Maine	0	0	0	14	8	7	0	0	0	0	0	0
New Hampshire	0	0	0	2	1	2	0	0	0	0	0	0
Vermont	0	0	0	6	2	2	0	0	0	0	0	0
Massachusetts	0	0	0	256	135	135	0	0	0	3	3	1
Rhode Island	0	0	0	25	5	5	0	0	0	0	0	1
Connecticut	3	0	0	44	12	29	0	0	0	1	1	1
MIDDLE ATLANTIC												
New York	6	3	1	189	167	316	0	0	0	7	13	10
New Jersey	1	0	0	35	55	70	0	0	0	1	4	2
Pennsylvania	1	0	0	85	113	163	0	0	0	4	4	7
EAST NORTH CENTRAL												
Ohio	1	0	1	62	101	101	0	1	0	7	6	4
Indiana	0	0	0	18	15	24	0	0	3	1	4	4
Illinois	0	3	2	87	87	173	0	0	5	4	2	4
Michigan [2]	0	2	2	52	99	208	0	0	1	12	0	3
Wisconsin	0	0	0	136	62	67	0	1	1	1	0	0
WEST NORTH CENTRAL												
Minnesota	0	1	1	19	20	23	0	0	1	0	0	0
Iowa	0	0	0	15	14	21	0	1	2	0	0	2
Missouri	1	1	0	14	13	25	0	0	0	0	1	6
North Dakota	0	0	0	5	6	6	0	0	0	0	0	0
South Dakota	0	0	0	3	13	6	0	1	1	0	0	0
Nebraska	0	0	0	5	6	10	0	0	0	0	0	0
Kansas	0	1	0	21	15	18	1	0	0	0	1	2
SOUTH ATLANTIC												
Delaware	0	0	0	1	9	5	0	0	0	1	2	0
Maryland [1]	0	1	0	27	22	22	0	0	0	2	2	1
District of Columbia	0	0	0	2	8	6	0	0	0	0	1	0
Virginia	1	0	2	10	7	7	0	0	0	5	7	5
West Virginia	0	0	1	11	13	15	0	0	0	4	4	4
North Carolina	0	1	1	11	5	13	0	0	0	1	10	10
South Carolina	1	0	0	1	0	2	0	0	0	1	0	6
Georgia	0	0	3	7	6	6	0	0	0	13	11	17
Florida	0	1	1	1	1	3	0	0	0	2	3	2
EAST SOUTH CENTRAL												
Kentucky	1	0	1	11	17	22	4	3	0	3	7	7
Tennessee	1	2	1	7	6	14	0	0	1	0	6	9
Alabama	2	2	2	3	3	4	0	0	0	2	2	8
Mississippi [1]	0	4	4	3	3	3	0	0	0	5	4	3
WEST SOUTH CENTRAL												
Arkansas	2	3	0	1	2	4	0	1	3	3	6	9
Louisiana	2	7	1	1	4	5	0	0	0	9	6	22
Oklahoma	8	0	1	9	1	7	0	0	0	2	8	8
Texas	39	1	2	28	25	18	0	0	0	18	21	24
MOUNTAIN												
Montana	0	0	0	2	9	8	0	0	0	0	0	1
Idaho	0	0	0	60	4	2	0	0	0	0	1	1
Wyoming	0	0	0	6	1	3	0	0	0	0	0	0
Colorado	0	1	0	24	0	17	0	2	2	3	4	4
New Mexico	2	0	0	2	4	4	0	0	0	0	3	1
Arizona	6	3	1	13	1	2	0	0	0	0	1	3
Utah [1]	0	1	0	13	7	5	0	0	0	0	2	1
Nevada	0	0	------	0	0	------	0	1	------	0	0	------
PACIFIC												
Washington	0	1	0	23	5	18	1	0	0	2	2	2
Oregon	0	0	0	10	7	7	2	0	2	1	0	1
California	58	2	7	129	78	107	0	1	1	6	3	5
Total	136	41	51	1,509	1,197	1,849	8	12	40	124	155	209
25 weeks	894	555	629	91,042	83,281	109,521	568	554	1,725	1,666	2,212	2,451

See footnotes at end of table.

Telegraphic morbidity reports from State health officers for the week ended June 26, 1943, and comparison with corresponding week of 1942 and 5-year median—Con.

Division and State	Whooping cough			Week ended June 26, 1943								
	Week ended		Median 1938–42	Anthrax	Dysentery			Encephalitis, infectious	Leprosy	Rocky Mt. spotted fever	Tularemia	Typhus fever
	June 26, 1943	June 27, 1942			Amebic	Bacillary	Unspecified					
NEW ENGLAND												
Maine	6	25	25	0	0	0	0	0	0	0	0	0
New Hampshire	4	2	2	0	0	0	0	0	0	0	0	0
Vermont	12	90	21	0	0	0	0	0	0	0	0	0
Massachusetts	96	186	144	0	0	0	0	0	0	0	0	0
Rhode Island	34	16	18	0	0	0	0	0	0	0	0	0
Connecticut	21	95	54	0	0	2	0	0	0	0	0	0
MIDDLE ATLANTIC												
New York	245	436	362	0	4	4	0	3	0	0	1	1
New Jersey	181	325	231	0	2	0	0	0	0	0	0	1
Pennsylvania	277	206	250	0	1	0	0	0	0	2	0	0
EAST NORTH CENTRAL												
Ohio	168	173	173	0	0	0	0	1	0	0	0	0
Indiana	60	43	24	0	1	0	1	0	0	0	0	0
Illinois	156	271	224	0	2	2	1	0	0	1	0	0
Michigan [2]	249	173	173	0	0	0	0	0	0	0	0	0
Wisconsin	225	169	169	0	0	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota	48	39	39	0	2	0	0	0	0	0	1	0
Iowa	59	28	24	0	0	0	0	0	0	3	0	0
Missouri [2]	36	4	28	0	0	0	1	0	0	0	0	0
North Dakota	7	17	14	0	0	0	0	0	0	0	0	0
South Dakota	5	2	1	0	0	0	0	1	0	0	0	0
Nebraska	11	6	6	0	0	0	0	0	0	0	0	0
Kansas	88	46	56	0	0	0	0	0	0	0	0	0
SOUTH ATLANTIC												
Delaware	12	2	7	0	0	0	0	0	0	1	0	0
Maryland [1]	148	55	64	0	0	0	1	0	0	6	0	0
District of Columbia	38	28	10	0	2	0	0	0	0	0	0	0
Virginia	190	51	99	0	0	0	125	0	0	3	2	0
West Virginia	86	23	33	0	0	0	0	0	0	1	0	0
North Carolina	273	128	155	0	0	1	0	0	0	1	0	2
South Carolina	70	40	72	0	0	45	0	0	0	0	2	0
Georgia	37	49	47	0	0	23	10	0	0	0	2	18
Florida	23	13	13	0	5	0	0	0	0	0	0	12
EAST SOUTH CENTRAL												
Kentucky	80	41	44	0	0	0	5	0	0	0	1	0
Tennessee	62	8	44	0	0	0	12	0	0	1	1	0
Alabama	96	29	40	0	0	0	0	1	0	0	0	5
Mississippi [2]				0	0	0	0	0	0	0	1	2
WEST SOUTH CENTRAL												
Arkansas	31	17	25	0	2	23	0	0	0	0	9	0
Louisiana	13	14	32	1	0	4	0	0	0	0	0	2
Oklahoma	68	16	16	0	0	0	0	0	0	[3] 4	0	1
Texas	566	248	248	0	85	316	0	0	0	0	2	26
MOUNTAIN												
Montana	54	15	15	0	0	0	0	0	0	1	3	0
Idaho	1	7	7	0	0	0	0	0	0	1	0	0
Wyoming	0	3	5	0	0	0	0	0	0	2	0	0
Colorado	42	30	30	0	0	0	0	1	0	0	0	0
New Mexico	13	26	23	0	0	0	1	0	0	0	0	0
Arizona	27	12	31	0	1	0	28	0	0	0	0	0
Utah [2]	67	31	69	0	0	0	0	0	0	2	1	0
Nevada	0	0		0	0	0	0	0	0	0	0	0
PACIFIC												
Washington	53	16	61	0	0	0	0	0	0	1	0	0
Oregon	49	30	30	0	0	0	0	0	0	0	0	0
California	282	191	244	0	1	6	0	4	1	0	1	0
Total	4,369	3,475	3,862	1	108	426	185	11	1	[3] 30	27	70
25 weeks	101,969	95,277	98,028	34	917	5,718	1,552	274	13	160	465	1,204
25 weeks, 1942				40	488	2,849	1,553	218	32	187	486	954

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Exclusive of delayed report of 4 cases in Oklahoma during May.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 12, 1943

This table lists the reports from 86 cities of more than 10,000 population distributed throughout the United States, and represents a cross section of the current urban incidence of the diseases included in the table.

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
NEW ENGLAND												
Maine:												
Portland	0	0	----	0	86	1	3	0	1	0	0	9
New Hampshire:												
Concord	0	0	----	0	0	0	2	0	0	0	0	0
Vermont:												
Barre	0	0	----	0	0	0	0	0	0	0	0	0
Massachusetts:												
Boston	1	0	----	0	225	10	13	0	122	0	2	20
Fall River	0	0	----	0	41	0	0	0	1	0	0	2
Springfield	0	0	----	0	33	0	1	1	29	0	0	1
Worcester	0	0	----	0	24	0	5	0	13	0	0	1
Rhode Island:												
Providence	0	0	----	0	6	1	0	1	19	0	0	28
Connecticut:												
Bridgeport	0	0	----	0	1	2	0	0	0	0	0	0
Hartford	1	0	----	0	18	0	5	0	1	0	0	0
New Haven	0	0	----	0	24	1	2	0	4	0	0	1
MIDDLE ATLANTIC												
New York:												
Buffalo	0	0	----	1	49	2	2	0	9	0	0	14
New York	8	0	2	2	1,449	42	72	3	207	0	3	73
Rochester	0	0	----	0	130	1	1	0	1	0	0	11
Syracuse	0	0	----	0	35	2	5	0	4	0	0	14
New Jersey:												
Camden	0	0	----	0	2	0	2	0	0	0	0	2
Newark	0	1	2	1	233	4	5	0	4	0	0	31
Trenton	1	0	----	0	8	0	4	0	3	0	0	0
Pennsylvania:												
Philadelphia	3	0	----	0	172	9	18	0	51	0	0	72
Pittsburgh	0	2	1	0	20	3	3	0	8	0	0	62
Reading	0	0	----	0	23	0	0	0	1	0	0	9
EAST NORTH CENTRAL												
Ohio:												
Cincinnati	0	0	----	0	29	0	1	1	13	0	0	6
Cleveland	1	0	2	1	23	1	9	0	15	1	0	39
Columbus	0	0	----	0	40	0	1	0	2	0	0	2
Indiana:												
Fort Wayne	0	0	----	0	17	0	1	0	1	0	0	0
Indianapolis	1	0	----	0	78	3	1	0	13	0	0	11
South Bend	0	0	----	0	13	0	0	0	1	0	0	0
Terre Haute	0	0	----	0	0	0	0	0	0	0	0	0
Illinois:												
Chicago	9	0	3	2	482	6	24	1	48	0	2	82
Springfield	0	0	----	0	2	0	0	0	0	0	0	3
Michigan:												
Detroit	0	0	----	0	1,167	13	10	0	21	0	0	98
Flint	0	0	----	0	84	0	0	0	3	0	0	12
Grand Rapids	0	0	----	0	98	0	0	0	6	0	0	27
Wisconsin:												
Kenosha	0	0	----	0	2	0	0	0	4	0	0	2
Milwaukee	0	0	----	0	443	1	1	0	107	0	0	83
Superior	0	0	----	0	45	0	0	0	0	0	0	0
WEST NORTH CENTRAL												
Minnesota:												
Duluth	0	0	----	1	71	0	0	0	3	0	0	4
Minneapolis	1	0	----	0	161	2	2	0	9	0	0	8
St. Paul	0	0	----	0	26	1	6	0	5	0	0	25
Missouri:												
Kansas City	0	0	----	0	44	2	7	0	13	0	0	9
St. Joseph	0	0	----	0	7	0	0	0	0	0	0	0
St. Louis	0	0	----	0	50	9	10	0	7	0	0	22
North Dakota:												
Fargo	0	0	----	0	0	0	0	0	0	0	0	0

City reports for week ended June 12, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza		Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
			Cases	Deaths								
WEST NORTH CENTRAL—continued												
Nebraska:												
Omaha	2	0	------	0	4	0	3	0	4	0	0	0
Kansas:												
Topeka	0	0	------	0	52	1	0	0	0	0	0	9
Wichita	0	0	------	0	5	1	6	0	2	0	0	7
SOUTH ATLANTIC												
Delaware:												
Wilmington	0	0	------	0	10	0	1	0	0	0	0	2
Maryland:												
Baltimore	6	1	------	1	182	11	15	0	26	0	1	114
Cumberland	0	0	------	0	0	0	0	0	0	0	0	0
Frederick	0	0	------	0	0	0	0	0	0	0	0	0
District of Columbia:												
Washington	0	0	1	0	89	7	7	0	6	0	0	41
Virginia:												
Lynchburg	0	0	------	0	2	0	2	0	0	0	1	25
Richmond	1	0	------	0	18	1	1	0	1	0	2	11
Roanoke	0	0	------	0	0	0	0	0	0	0	0	1
West Virginia:												
Wheeling	0	0	------	0	0	0	0	0	0	0	0	0
North Carolina:												
Winston-Salem	0	0	------	0	2	0	1	0	0	0	0	32
South Carolina:												
Charleston	0	0	------	0	0	2	1	0	0	0	0	6
Georgia:												
Atlanta	0	0	7	1	9	1	1	0	3	0	1	3
Brunswick	0	0	------	0	1	0	3	0	0	0	0	0
Savannah	0	0	------	0	1	0	1	0	0	0	0	1
Florida:												
Tampa	0	0	------	0	2	0	1	0	0	0	1	0
EAST SOUTH CENTRAL												
Tennessee:												
Memphis	0	0	------	1	25	2	2	0	1	0	0	10
Nashville	0	0	------	0	2	1	0	0	1	0	0	14
Alabama:												
Birmingham	0	1	5	0	14	0	1	0	1	0	0	1
Mobile	0	0	------	1	1	0	0	0	0	0	0	0
WEST SOUTH CENTRAL												
Arkansas:												
Little Rock	0	0	------	0	1	0	1	0	0	0	0	1
Louisiana:												
New Orleans	0	0	4	0	22	0	5	0	0	0	1	6
Shreveport	0	0	0	0	0	0	5	0	0	0	0	0
Texas:												
Dallas	3	0	1	1	1	1	1	2	2	0	0	6
Galveston	0	0	------	0	0	0	4	0	0	0	0	5
Houston	0	0	------	0	1	3	4	1	2	0	1	23
San Antonio	1	0	------	0	0	0	7	1	1	0	0	5
MOUNTAIN												
Montana:												
Billings	0	0	------	0	13	0	0	0	0	0	0	0
Great Falls	0	0	------	0	20	0	1	0	2	0	0	1
Helena	0	0	------	0	4	0	0	0	0	0	0	0
Missoula	0	0	------	0	2	0	1	0	0	0	0	0
Idaho:												
Boise	0	0	------	0	0	0	0	0	0	0	0	0
Colorado:												
Denver	1	0	10	1	59	1	7	0	8	0	0	10
Pueblo	0	0	------	0	3	0	0	0	3	0	0	7
Utah:												
Salt Lake City	0	0	------	0	49	1	1	0	5	0	0	31

City reports for week ended June 12, 1943—Continued

	Diphtheria cases	Encephalitis, infectious, cases	Influenza cases	Influenza deaths	Measles cases	Meningitis, meningococcus, cases	Pneumonia deaths	Poliomyelitis cases	Scarlet fever cases	Smallpox cases	Typhoid and paratyphoid fever cases	Whooping cough cases
PACIFIC												
Washington:												
Seattle	5	0	-----	0	136	2	7	0	3	0	0	12
Spokane	1	0	1	1	4	0	4	0	2	0	0	13
Tacoma	0	0	-----	0	2	0	0	0	1	0	0	3
California:												
Los Angeles	5	0	11	0	0	4	10	5	19	0	0	45
Sacramento	0	0	-----	0	1	1	3	0	2	0	0	6
San Francisco	2	0	2	1	69	1	11	0	12	0	2	49
Total	53	5	52	16	6,267	157	334	16	856	1	17	1,283
Corresponding week, 1942	65	1	26	8	4,003	32	222	1	722	0	22	1,286
Average, 1938–42	73	-----	42	[1] 14	[2] 4,153	-----	[1] 268	-----	996	8	28	1,194

Dysentery, amebic.—Cases: New York, 2.
Dysentery, bacillary.—Cases: Buffalo, 8; New York, 3; Syracuse, 1; Charleston, S. C., 10; Los Angeles, 5.
Dysentery, unspecified.—Cases: San Antonio, 12.
Rocky Mountain spotted fever.—Cases: Cincinnati, 1; St. Louis, 2.
Typhus fever.—Cases: Tampa, 3.

[1] 3-year average, 1940–42.
[2] 5-year median.

Rates (annual basis) per 100,000 population, by geographic groups, for the 86 cities in the preceding table (estimated population, 1942, 34,548,400)

	Diphtheria case rates	Encephalitis, infectious, case rates	Influenza case rates	Influenza death rates	Measles case rates	Meningitis, meningococcus, case rates	Pneumonia death rates	Poliomyelitis case rates	Scarlet fever case rates	Smallpox case rates	Typhoid and paratyphoid fever case rates	Whooping cough case rates
NEW ENGLAND	5.0	0.0	0.0	0.0	1,138	37.3	77.0	5.0	472	0.0	5.0	154
MIDDLE ATLANTIC	5.4	1.3	2.2	1.8	946	28.1	50.0	1.3	128	0.0	1.3	128
EAST NORTH CENTRAL	6.5	0.0	2.9	1.8	1,484	14.1	28.2	1.2	138	0.6	1.2	215
WEST NORTH CENTRAL	5.9	0.0	0.0	2.0	821	31.3	66.5	0.0	84	0.0	0.0	164
SOUTH ATLANTIC	12.4	1.8	14.2	3.5	561	39.0	60.3	0.0	64	0.0	10.6	419
EAST SOUTH CENTRAL	0.0	5.9	29.7	11.9	249	17.8	17.8	0.0	18	0.0	0.0	148
WEST SOUTH CENTRAL	11.7	0.0	14.7	2.9	73	11.7	79.2	11.7	15	0.0	5.7	135
MOUNTAIN	8.0	0.0	80.4	8.0	1,206	16.1	80.4	0.0	145	0.0	0.0	394
PACIFIC	22.7	0.0	24.5	3.5	371	14.0	61.2	8.7	68	0.0	3.5	224
TOTAL	8.0	0.8	7.8	2.4	946	23.7	50.4	2.4	129	0.2	2.6	194

PLAGUE INFECTION IN NEW MEXICO AND OREGON

Plague infection has been reported proved in pools of fleas and lice from mice and ground squirrels collected in New Mexico and Oregon as follows:

NEW MEXICO

Union County.—June 1, in a pool of 8 fleas from 11 grasshopper mice, *Onychomys leucogaster*, taken 9 miles south of Clayton on State Highway No. 18.

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OREGON

Union County.—June 5, in a pool of 187 fleas and 15 lice from 93 ground squirrels, *C. oregonus*, taken 1 to 5 miles west of North Powder.

TERRITORIES AND POSSESSIONS

Hawaii Territory

Plague (rodent).—Five plague infected rats have been reported in Honokaa, Hamakua District, Island of Hawaii, T. H., as follows: One rat on April 24, 1943, 2 rats on April 26, 1 rat on April 29, and 1 rat on May 4, 1943.

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FOREIGN REPORTS

CANADA

Provinces—Communicable diseases—Week ended May 29, 1943.—During the week ended May 29, 1943, cases of certain communicable diseases were reported by the Dominion Bureau of Statistics of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Chickenpox		23		100	303	36	20	27	72	581
Diphtheria		11	1	15		4				31
Dysentery (bacillary)				2						2
German measles		19		14	210	10	13	37	29	332
Influenza		2			43	6	4		12	67
Measles		68		269	1,686	72	146	234	399	2,874
Meningitis, meningococcus					3		1		1	5
Mumps		48	4	61	775	78	49	90	117	1,222
Poliomyelitis					1	1				2
Scarlet fever		23	12	99	243	43	57	76	44	597
Tuberculosis (all forms)	10	8	8	120	48	18		3	20	235
Typhoid and paratyphoid fever				9				1		10
Undulant fever				1	2					3
Whooping cough				57	168	40	9	24	95	393

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—Except in cases of unusual prevalence, only those places are included which had not previously reported any of the above-mentioned diseases, except yellow fever, during the current year. All reports of yellow fever are published currently.

A cumulative table showing the reported prevalence of these diseases for the year to date is published in the PUBLIC HEALTH REPORTS for the last Friday in each month.

(Few reports are available from the invaded countries of Europe and other nations in war zones.)

Smallpox

Algeria.—For the period May 11–20, 1943, 24 cases of smallpox were reported in Algeria.

Typhus Fever

Algeria.—For the period May 11–20, 1943, 333 cases of typhus fever (35 in Europeans) were reported in Algeria.

Hungary.—For the period May 23–June 5, 1943, 37 cases of typhus fever were reported in Hungary.

Rumania.—For the period June 1-7, 1943, 159 cases of typhus fever were reported in Rumania.

Slovakia.—For the period May 16–22, 1943, 29 cases of typhus fever were reported in Slovakia.

Spain.—For the period April 11–27, 1943, 17 cases of typhus fever were reported in Spain.

COURT DECISIONS ON PUBLIC HEALTH

Typhoid fever—held to be accidental injury under workmen's compensation law.—(Maryland Court of Appeals; *Union Mining Co. et al.* v. *Blank*, 28 A.2d 568; decided October 29, 1942.) An employee contracted typhoid fever through drinking water furnished him by his employer. A laborer with buckets and dippers was provided by the employer and this laborer brought water at the expense of the employer from a spring about 400 or 500 feet away from the place of employment. This spring had been used with apparent immunity by the community for 100 years. The Maryland workmen's compensation law provided as follows: " 'Injury', 'personal injury' and 'accidental personal injury' means only accidental injuries arising out of and in the course of employment and such disease or infection as may naturally result therefrom, * * *." The question before the State court of appeals was whether the infection of the employee was an accidental injury within the meaning of such compensation statute.

The appellate court, after reviewing many cases from other jurisdictions, stated that the question had not before been precisely presented to it but that there were a number of Maryland cases bearing on certain phases of the subject. These latter cases were then cited and discussed, following which the court said that it would be seen that under the Maryland law "an accidental injury is one happening by chance or taking place unexpectedly or unintentionally; that the injury need not be created by wound or external violence; and that the conditions causing an injury do not have to be confined to a particular and single time and place, but may extend over a considerable period." The court's view was that an application of its previous decisions to the facts of the instant case showed that the acquisition of typhoid fever by the employee was accidental. According to the court, the finding of typhoid bacteria in the water was clearly unexpected and was something which the employee did not look for and had no reason to suppose existed. Under the definition given "accidental" by the court and by the majority of the other courts passing upon it, and also by the standard dictionaries, the introduction of the typhoid bacilli into the system of the employee was therefore accidental. The injury was the infection or the ulceration of the intestines by the bacilli and it clearly arose out of and in the course of the employment because the water was drunk by the employee while working and was furnished him by the employer as part of the working conditions.

The judgment of the lower court in favor of the employee was affirmed.

COURT DECISION ON PUBLIC HEALTH

Death from lead poisoning held compensable under workmen's compensation act.—(South Carolina Supreme Court; *Strawhorn* v. *J. A. Chapman Const. Co. et al.*, 24 S.E.2d 116; decided January 22, 1943.) The Workmen's Compensation Act of South Carolina defined "injury" and "personal injury" as meaning only "injury by accident arising out of and in the course of the employment" and as not including "a disease in any form, except where it results naturally and unavoidably from the accident." In a proceeding under the said act the State supreme court affirmed an award of compensation for the death from lead poisoning of a person employed as a house painter. The question was presented to the court as to whether the death was caused by accident or whether it was the result of a noncompensable disease. The deceased, who was taken ill suddenly, was 35 years old and of former good health and habits and had been a house painter for 15 years. According to the court the evidence indicated that an acute attack of lead poisoning was not to be expected by the deceased employee because of his years of former painting experience without such and the rarity of it. The conclusion was reached that there was evidence to support the finding that he had been subjected to lead from paint dust in an unusual or unexpected quantity and the holding was, therefore, that there was a compensable injury by accident. The element of surprise or improbability, said the court, necessary to constitute an accident in contemplation of law need only be in the result or effect of the happening. The court also stated that it did not matter that "such unusual and accidental inhalation merely aggravated deceased's prior dormant condition as a victim (if he was) of lead poisoning, for such aggravation, resulting in death, would make the latter compensable."

Inflammation of the eyes of the newborn—reporting.—(Ohio Court of Appeals; *Dietsch* v. *Mayberry*, 47 N.E.2d 404; decided May 18, 1942.) An action for damages was brought against the defendant, a physician, for alleged malpractice. The defendant was the attending physician at the plaintiff's birth on April 4, 1940. It appeared that the plaintiff's eyes were then swollen more than normal and that the nurses, at the defendant's direction, instilled the prophylactic required by the law of Ohio. On April 7 and 11 the defendant visited the plaintiff and at those times the latter's eyes were swollen and there was some discharge. Later one of the eyes ruptured and, when it failed to respond to treatment, was removed. In the trial court the judgment was for the defendant and the plaintiff appealed to the court of appeals.

One error assigned by the plaintiff on appeal was that the lower court, on the defendant's motion, withdrew from the jury's consideration as a ground of negligence the allegation of the petition that the defendant failed to report to the local health officer, as required by the statutes of Ohio, that the plaintiff was suffering from inflammation of the eyes of the newborn. The appellate court reviewed the statutory provisions concerning this condition and stated that these statutes had a twofold purpose: (1) To benefit the newborn by preventing blindness, and (2) to relieve the public generally from the burden another blind person would cast upon it. The holding of the court, with respect to the contention of the plaintiff, was that the latter was entitled to have the jury determine whether the defendant violated the statute as to reporting and, if so, to treat such violation as negligence per se.

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